Below Ground Drainage

Rosponse to

London Borough of Hounslow

Planning Authority

Question Number 4

In Support of

Planning Application

P/2015/2516

For

Proposed Nishkam School

Syon Lane,

Isleworth

Greater London

TW7 5PN.

July 2015.

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BAM Design Technical Report.

SUBJECT

Response to Planning query number 4.

CLIENT: BAM Construction South East.

PROJECT: Nishkam School, Syon Lane, Isleworth.

Contract no:
Prepared by: S Bliss.

Job no: 4467.
Checked by: SGB.

Date: July 2015.

Status of drawings / specifications: For Information.

AMENDMENTS				
ref.	date	amendment	amended by	checked by
In0	July 2015	Issue to satisfy planning questions.	SB	SB

Contents

1.0 Introduction.

A planning application has been submitted to London Borough of Hounslow for the construction of a new Secondary school facility off Syon Lane, Isleworth.

The planning submission included a below ground storm water drainage strategy drawing and associated description / report. This information has prompted the planning query number 4 which reads:

"Further details are required on future maintenance of hydro brakes and flood storage on football pitch" (none have been provided with the application)

This document attempts to answer this question and allay any fears the planning officer may have.

2.0 Vortex Flow Controls.

"Hydrobrake" is a generic description used to describe a Vortex Flow control. These units are used to manage the volume of storm water run-off from developments during heavy rainfall periods. Many companies produce these units which are often manufactured to suit each individual development. ACO Technologies plc have been selected to provide the flow control unit for this particular project. Their product name is referred to as a "Q-BRAKE".

Appendix A provides a standard detail for the installation of these units.

The following statements have generally been extracted from ACO Technologies technical literature.

The statements referring to maintenance of the unit will be included within the buildings Operating and Maintenance manuals that are handed to the facility operators on completion of the works.

Commissioning the project.

Before the product is commissioned, the chamber containing the ACO Q-Brake vortex should be inspected in line with normal practice. Any debris or silt should be removed. Any visible fixing bolts should be checked.

If an internal blockage is suspected, the control can be inspected internally and cleaned out by opening the inspection bypass door on the upstream end. The bypass door must be returned to the closed position before the control becomes operational.

Frequency of Inspection / Maintenance.

Inspections should be carried out at frequent and regular intervals (approximately every 3-6 months). The frequency will depend upon the location and the environment, and should be based local knowledge. Action is only required in the event of a blockage or suspected blockage.

Maintenance Plan.

ACO Q-Brake Vortex flow controls require no routine maintenance although inspections should be carried out at regular intervals. (See frequency of inspection / maintenance above).

3.0 Future maintenance of flood storage on football pitch.

Attenuation proposal.

The retained football pitch has a slope of approximately 850mm across its diagonal. It is therefore proposed to bund the lowest corner of this pitch and utilise the volume for storm water attenuation and flood alleviation measures.

Water will enter / exit the bunded volume via a gravel filled distribution / collection trench located at the base of the bund. This trench will have a piped connection to the storm water drainage system.

The top level (ground level) of the trench will be the lowest ground level connected to the storm drainage network. The network will be provided with an ACO Q-Brake vortex flow control device located immediately downstream of this gravel filled trench.

At times of very high (rainfall) flow, the water that is restricted by the flow control will back up within the drainage system. When this water reaches the low ground level of the football field, the water will flood out of the gravel filled trench and onto the football field where it will be contained by the previously described bund. A perforated distribution / collection pipe within the base of the trench will ensure water exits the trench evenly along its length.

Once the storm has rescinded, the water will continue to discharge off site at the controlled rate. The water level within the network will therefore drop, this will allow the stored water on the football pitch to re-enter the drainage network and discharge off site. The gravel filled trench will act as a filter and prevent any silts / debris entering the drainage network.

Appendix B provides a detail of the proposed water distribution trench.

Future Maintenance.

This report has already talked about the inspection regime of the vortex flow control unit. Whilst these inspections are being performed, the flood water distribution / collection trench and football field should also be inspected.

The granular material and perforated distribution / collection pipe within the trench will be provided with a geotextile surround. This material will prevent any silts / debris entering the main body of the trench.

A 150mm pea shingle granular layer will be placed on top of the geotextile protective surround. This granular fill will act as a course filter intercepting leaves, litter and other debris from entering the trench. The regular inspections of this granular layer will determine as and when the material needs to be washed / cleaned. Whilst this cleaning process is being performed access will be gained to inspect the geotextile which should be repaired in the unlikely event it has become damaged.

In compliance with Environment Agency requirements, flood water is expected to half drain within 12 hours. We therefore do not expect flood water to be stored on the pitch for more than 24 hours. Our experience suggests that grasses are adequately robust to withstand any ill effects from these flood durations.

Further advice on this matter may be sought from specialist landscape architects.

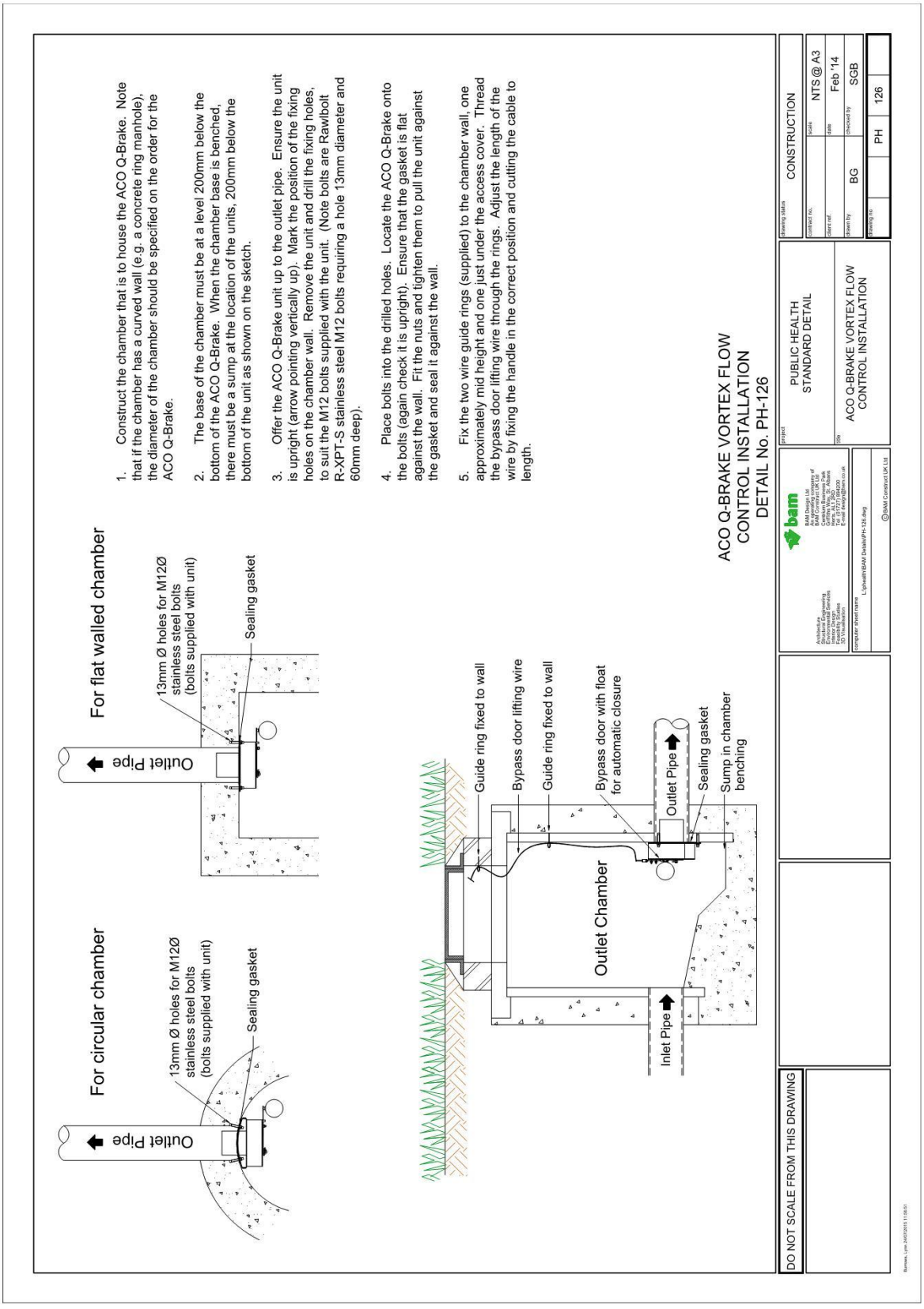
4.0 Maintenance of Porous Surface Drainage systems such as car parks.

Porous Surface Hard Standing and Car parks are accepted SuDS drainage technics. Water falls onto and passes through the surface and stored within a granular sub base below. This sub base acts as a storage reservoir providing storm water attenuation.

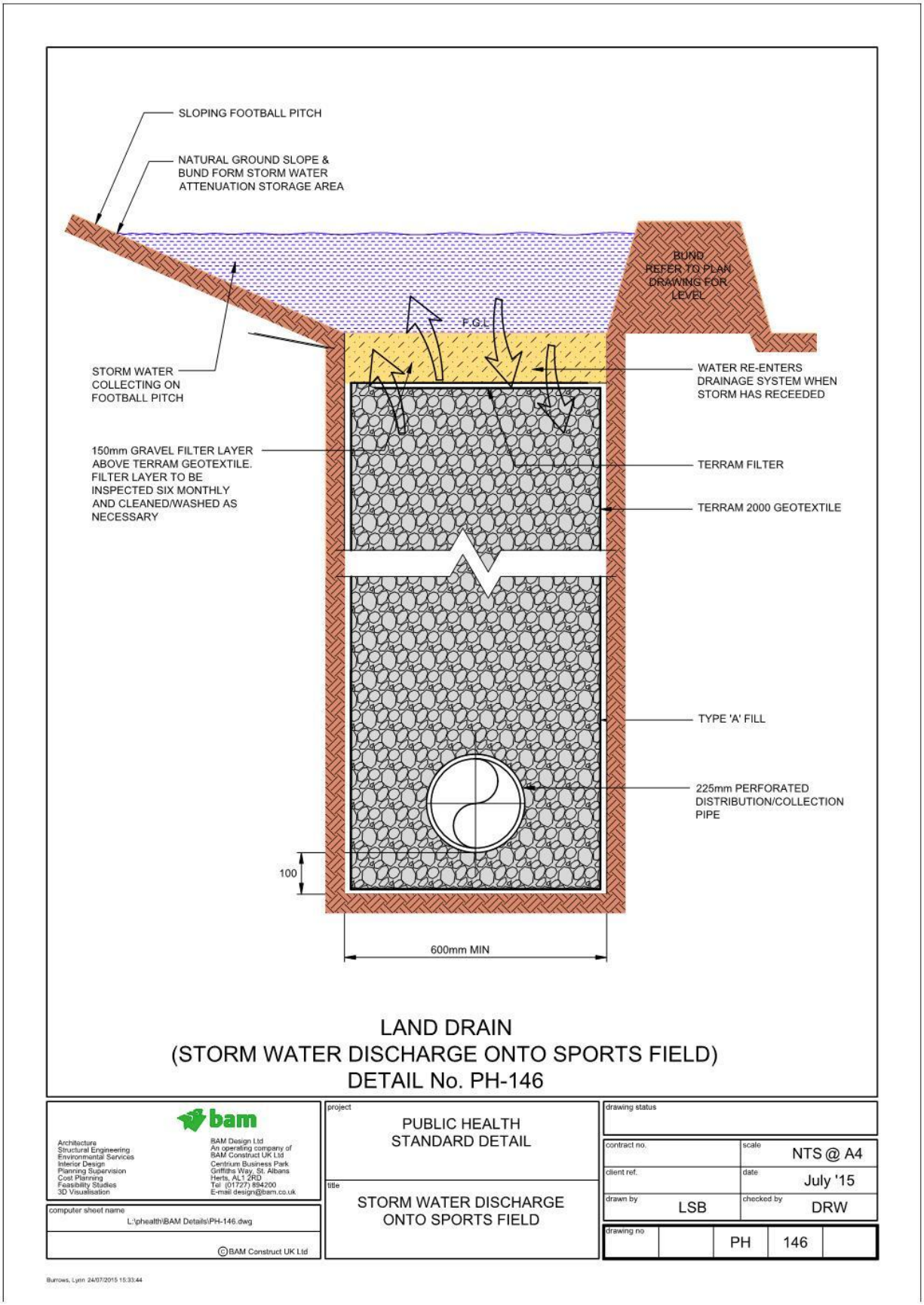
These SuDS structures negate the need for Petrol Interceptors as microbiological bacteria form within the sub base. These organisms naturally feed on and break down any hydrocarbons (oils) that may enter the sub base. The control of pollutants and all other design and maintenance aspects associated with porous pavement design are discussed within CIRIA publication C582, Source Control using Constructed Pervious Surfaces.

Appendix C provides Cambridge City Councils discussion of maintenance for porous surfaces. The same appendix provides Anglian Water's recommendation for the maintenance of porous surfaces. This generally concurs with previously mentioned CIRIA publication C582 and will be included within the operation and maintenance manuals for the building that will be handed over upon completion of the contract.

Appendix A. Installation detail for ACO Q-Brake Vortex Flow Control.



Appendix B. Detail of Flood Water Distribution / Collection Trench.



Appendix C. Maintenance of Porpous surfaces.

Extract From Cambridge City Council, Sustainable Drainage, Design & Adoption Guide.

Permeable pavements

Permeable pavements can be used in driveways, parking areas and some roads. They allow water to soak through the surface into the gravel subbase below. This temporarily holds the water before allowing it to either soak into the ground or pass to an outfall, often to another SUDS feature such as a swale. Permeable pavements are very effective at controlling the flow of water and removing pollution from it.

There are a variety of surfacing materials available. The most common are concrete or clay permeable block paving. Other surfaces include porous asphalt, reinforced grass and gravel. Further information is available in CIRIA Report C582, from Interpave and the Environment Agency. Concrete block permeable paving should be designed in accordance with British Standard BS 7533-13:2009.

It is now law in England that new and refurbished driveways in front gardens must be constructed using permeable surfaces, otherwise planning permission will be required for the construction. Their use in new developments is essential under this legislation.

There is common misconception that permeable surfaces quickly clog. Studies in the UK and elsewhere have found that there is a reduction in the permeability of the surface but in normal situations this levels off at a rate that is still more than adequate to deal with UK rainfall. If they become completely clogged they can be cleaned out with a road sweeper using a water jet and suction. Most problems occur due to clogging caused by construction debris or inappropriate levels for the adjacent landscape areas, such that dirt washes onto the surfaces.

Permeable block paving being machine laid in Cambridgeshire

Extract From Anglian Water SuDS Manual.

10.5 Permeable pavements

Permeable pavements provide a surface that is suitable for pedestrian or vehicle traffic while allowing surface water runoff to percolate directly through the surface into underlying open stone construction. Surface water runoff passing through permeable pavement leaves silt on or just below the surface but oils and other pollutants are trapped on geotextiles or in the stone construction for biodegradation by bacteria. Surface water runoff is stored in the construction before infiltration or controlled discharge to the management train.

The design of permeable pavements comprises a structural element for loading and a hydraulic consideration for water storage.

Permeable pavement includes permeable block paving, porous asphalt, gravel surfaces and engineered grass surfaces.

Key Design Standards

- Permeable pavements need to be designed structurally to meet loading and traffic requirements.
- Storage must be sufficient for infiltration rates or to meet attenuation requirements.
- The use of a geotextile as an upper separating or treatment layer may be considered as an option depending on site constraints.
- Pervious surfaces are susceptible to silt blockage and surrounding landscape details, slopes and management must take this into account.
- Three types are currently identified:
  - Total infiltration with a lower separating geotextile.
  - Partial infiltration with an overflow outlet from the pavement.
  - No infiltration usually with an impermeable separating membrane and controlled outlet onward to the management train or discharge point.